

REMARKS

This is in response to the Office Action of February 19, 2010. Claim 1 is amended to recite the feature of claim 2. Claim 2 is accordingly cancelled, without prejudice. Claim 1 is also amended to recite the features of claim 7 and 8. Claims 7 and 8 are accordingly cancelled, without prejudice. Claim 9 is amended to recite the features of claim 7 and 8. Claim 9 is also amended to recite the feature of claim 10, and claim 10 is cancelled, without prejudice. Claim 12 is amended to recite the features of claim 7 and 8. Claim 12 is also amended to recite the feature of claim 13, and claim 13 is cancelled, without prejudice. Claim 16 is amended to recite the features of claim 7 and 8. Claim 18 is amended to recite the features of claim 7 and 8. Claim 18 is also amended to recite the feature of claim 19, and claim 19 is cancelled, without prejudice. Support for additional amendments to claims 1, 9, 12, 16 and 18 can be found on page 6 of the present specification. No new matter is introduced by this Amendment. Claims 1, 3-6, 9, 11, 12, 14-18, and 20 remain pending in the application.

Prior art rejection

Claims 1-20 were rejected under 35 U.S.C. § 103(a) as being unpatentable over US 4,000,032 (Bergstrom) in view of WO 03/029329 (Swatloski) and PCT/AU01/00100 or its equivalent, US 2003/0157268 (Gutowski). Office Action, pages 4-7. The rejection is respectfully traversed.

On page 9 of the Office Action, the Examiner states that “it is noted that the features, upon which application relies [to overcome the prior art rejection] (i.e. lignocellulosic material which has not been subjected to a pulping or defibering process) are not recited in the rejected claims(s).” By the present Amendment, the features in question are recited in all pending claims. It is respectfully submitted, therefore, that the present claims should be taken as overcoming the prior art rejection of record.

Applicants respectfully submit that the Bergstrom and Swatloski and Gutowski disclosures, even as combined by the Examiner, fail to teach or suggest “A method for dissolving lignocellulosic material comprising: providing a lignocellulosic material of untreated straw or untreated wood wherein the wood structure including the cell wall structure is intact and which has not been subjected to a pulping or defibering process; mixing the lignocellulosic material with an

*ionic liquid solvent*; and subjecting the lignocellulosic material to microwave irradiation in the substantial *absence of water* to completely *dissolve the lignocellulosic material*.”

### **Combining the references**

First of all, it is submitted that a person skilled in the art, facing the need of recovering cellulose and lignin would not combine the teachings from Bergstrom and Swatloski. The main reason is that in the Bergstrom method it is essential to use wet wood chips i.e. chips having 60–70% water content. In Swatloski’s method non-aqueous ionic liquids are used for dissolving pure cellulose. These two conditions and requirements are contradictory. Thus, it would not be clear to one skilled in the art as to whether to use an aqueous method or a non-aqueous method to initiate the processing.

In any event, Bergstrom provides a process for producing cellulose by a physical method for freeing cellulose fibers without dissolving them. Thus, the aim is only to break the structure of wood in order to make the fibers more available and accordingly there is no intention or need to recover lignin.

For Bergstrom’s method, high water content is essential (“important” see col. 4 lines 54–62), contrary to the method of the present invention, thus clearly teaching away from the present invention. In Bergstroms method no lignin recovery or any process steps in such direction are contemplated contrary to the method of the present invention.

Swatloski teaches dissolving pure cellulose in an ionic liquid, preferably, assisted by microwave irradiation. It is unlikely that ionic liquid would have been applied to the untreated wood material with lignin and other components therein for all of the reasons previously stated.

Facing the need of recovering both lignin and cellulose fibers from wood chips, one skilled in the art would start the process using Bergstrom’s method, starting from wood chips. How Swatloski’s teaching could be combined with the method of Bergstrom is not clear. Several scenarios are available:

- First, one skilled in the art would follow the teaching of Bergstrom and wet the wood chips, as this was described to be essential.
- Secondly, the person skilled in the art would try to separate cellulose from the wood chips by microwave treatment and would subsequently add ionic liquid to the thus obtained nearly pure cellulose fibers, as taught by Swatloski, for obtaining pure cellulose. An alternative procedure would be to add ionic liquid to the remainder of the wood chips after the microwave treatment and removal of cellulose for dissolving lignin therein which is not suggested by either the Bergstrom or Swatloski references. A further alternative would be to add the ionic liquid to the wet chips before the microwave treatment, which is not taught by Bergstrom and is also contrary to the teaching of Swatloski.
- These attempts will fail as the material to be dissolved is wet.

Gutowski merely discusses that cellulose, in natural materials never occurs in pure form, which is a known fact. The applicant respectfully argues that there is no implicate disclosure concerning the quality of the cellulose to be used. The statement used is merely concerning an inherent feature of natural material, such as wood, in that it always contains lignin together with cellulose. No hint or teaching is provided as to how to process natural material with lignin and cellulose to obtain pure cellulose and/or recover lignin.

When cellulose in pure form is desired lignocellulosic material is digested in an alkaline solution, as discussed in Bergstrom, which is a commonly known method to one skilled in the art. It appears to be hindsight to argue that Gutowski teaches replacing digesting in an alkaline solution with dissolution in ionic liquids.

Accordingly, since it would not be obvious to combine the references as suggested by the Examiner, reconsideration of the rejections and allowance of all the claims of the present application are respectfully requested.

Double patenting rejection

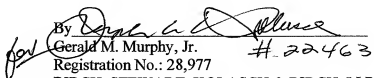
Claims 1-6, 12, 14, and 19 were provisionally rejected on the ground of obviousness-type double patenting over claims 1-3, 8-10, 12-15, and 17 of application Serial No. 10/585,055 Office Action, page 3. Since this ground of rejection was not applied to claim 7, and all of the claims in the application as amended hereinabove include the limitation of claim 7, this ground of rejection does not apply to any claim now presented herein.

Contact information

If there are any issues to be resolved in the present application, the Examiner is respectfully requested to contact Richard Gallagher, Reg. No. 28,781, at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

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Respectfully submitted,

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